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Service and conservation
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Service and Conservation Under the Three-Part Rate

By HENRY L. DOHERTY

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FIFTEENTH ANNUAL MEETING

OF

The Natural Gas Association of America

DOHERTY SCHOOL FOR SECURITIES SALESMEN

Broadway Auditorium

BUFFALO

May 17th, 18th, 19th and 20th, 1920

WM. B. WAY, Secretary

RESULTS UNDER THE THREE-PART RATE AT
OTTAWA, KANSAS

BY HENRY L. DOHERTY.

Since some of the data which follows was obtained in Ottawa, Kansas, where the Three-Part Rate is in effect, it may be well to summarize here some of the facts in connection with that installation.

Ottawa, prior to the installation of this rate, was being served by the Ottawa Gas and Electric Company with natural gas at a straight meter rate of eighty cents per thousand cubic feet. The Three-Part Rate, which was substituted as of January 1st for the straight meter rate previously in effect, consists of

A Customer Charge of \$9.00 per year per customer, payable in equal monthly instalments;

A Demand Charge of 32 cents per year per foot of maximum hourly demand, payable in equal monthly instalments; and

A Consumption Charge of 40 cents per thousand cubic feet of gas consumed.

After the adjustment of his appliances, each customer chose such a maximum demand as, with the advice of the company's service department, he determined was necessary to supply his needs. There was installed on his service an Empire limiting meter which restricts the flow of gas to a point that the customer in one hour secures only that number of feet of gas for which he pays a maximum demand. These limiting meters are made in various sizes and were installed as follows:

LIMITING METERS INSTALLED AT OTTAWA, KANSAS

Capacity Limiting Meters Feet Per Hour	Number of Customers	Per Cent. of Total Customers	Cumulative Per Cent.	Total Demand Cubic Feet
22.5	88	4.5	4.5	1980
30	169	8.3	12.8	4800
37.5	283	14.4	27.2	10612.5
45	477	24.3	51.5	21645
50	3	.2	51.7	150
52.5	184	9.4	61.1	9660
60	294	11.9	73.0	14040
67.5	88	4.5	77.5	5940
75	149	7.6	85.1	11175
82.5	31	1.6	86.7	2557.5
90	90	4.6	91.3	8100
97.5	8	.4	91.7	780
105	47	2.4	94.1	4935
112.5	1	.05	94.15	112.5
120	55	2.8	96.95	6600
127.5	3	.15	97.1	382.5
135	2	.1	97.2	270
142.5	2	.1	97.3	285
150	22	1.1	98.4	3300
157.5	2	.1	98.5	315
165	3	.15	98.65	495
180	3	.15	98.8	540
202.5	1	.05	98.85	202.5
210	11	.55	99.4	2310
225	1	.05	99.45	225
240	3	.15	99.6	720
250	2	.1	99.7	500
300	4	.2	99.9	1200
360	1	.05	99.95	360
400	1	.05	100.0	400
Total	1962	100.00		114562.5

As one result of the installation there was a fifty per cent. cut in the maximum possible demand on the lines of the Ottawa Gas and Electric Company in any given hour.

The average rate at which gas was sold in Ottawa of eighty cents per thousand cubic feet was reduced to approximately seventy-five cents per thousand cubic feet.

The contract which the customer will sign in Ottawa, and by which he agrees to pay a certain demand charge per year, will guarantee that demand to him at any time he may desire it within that year. Failure of the company to deliver that amount of gas at any time the customer may desire it will entitle the customer to a rebate of ten times the demand charge for the period and proportion of such failure.

The reduction of leakage that can be made without the expenditure of anything for main repairs will amount to about thirty per cent. This follows the installation of the limiting meters on the services of the customers, reducing their maximum demands and thereby reducing the pressure that it is necessary to carry in the mains.

THE REQUISITE OF A PROPER RATE.

From the standpoint of equity, the rate must distribute all of the costs of service between individual customers in direct proportion to their responsibility for those costs.

From the standpoint of public policy, a proper rate must penalize extravagant and wasteful uses of gas and put a premium on its efficient utilization, while under the law the rates must be non-discriminatory.

From the standpoint of continuation of service the rates in effect must allow the company an adequate revenue to properly maintain its operating department and an adequate and efficient plant.

I believe that the Three Part Rate fulfills all of those conditions.

BASIS OF THE THREE-PART RATE

There are in this rate three separate and distinct charges referred to respectively as Customer Charge, Demand Charge and Consumption Charge.

Under the Customer Charge there are distributed equally to each customer those expenses which bear no relation to his maxi-

mum demand in a given hour or to his total consumption in the year. Under this heading fall the cost of meter reading, book-keeping, labor, postage and stationery necessary to render bills; the expenses of the cashier's department; meter testing department, and fixed charges on that portion of the investment which is proportional to the number of customers on the system irrespective of their demands. The total of these expenses for a company having 10,000 customers will be practically twice that of the company having 5,000 customers and, therefore, should be proportionate to and distributed equally among the number of customers connected.

Under the Demand Charge there are distributed to each customer, in proportion to his maximum hourly demand, those fixed charges on that portion of the investment which does vary with the maximum demand placed on the system.

The two chief factors which determine the size of the investment of a particular company are: 1st; The number of customers; and, 2nd: The maximum demand that those customers place on the lines at any given time.

Our organization at one time had offered to them by-product coke oven gas, and we had two options as to where we would sell it. One of them was to a town in which we estimated we could get about 10,000 domestic consumers, and the other was a small group of industrial concerns. Either one would absorb all the gas we had available and their load characteristics were very similar. To supply 10,000 customers at 50 customers per mile would require 200 miles of street mains. These, at \$5,000 a mile, would cost \$1,000,000. In addition we would have to set 10,000 meters at about \$15.00 each, or \$1,500,000 more, making a total of \$1,150,000. If we supplied the industrial customers we would only have to supply a mile or two of pipe and a few large meters, making a total investment of considerably less than \$100,000.

The difference in these two cases then is the difference in the number of customers, of about 9,990, and a difference in investment of about a million dollars. In other words, those 9,990 additional customers required investments of over \$100.00 apiece. Interest, depreciation, maintenance, taxes, etc., at 10

per cent. means an annual charge per customer of \$10.00. To this we must add the collection expense and a portion of the general expenses, which would be about \$4.00 or \$5.00 a year, making a total cost of \$14.00 per domestic customer.

You will say that this figure includes in the distribution system provision for demand, but the same is true for the industrial customers. The demand is the same in both cases, the only difference being the number of customers. In other words, it costs us \$14,000 a year solely because we must deliver this gas to 10,000 places on 200 miles of street, instead of to only one or two places on four or five miles of street.

The size of the transmission lines is, of course dependent on the size of the maximum demand irrespective of whether that maximum demand is occasioned by supplying one customer or 10,000 customers. The fixed charges on that investment, the size of which is determined by the maximum demand, are distributed to each customer as a Demand Charge. The Demand Charge is uniform for equal demands and proportional to the demands. This is irrespective of the fact that one customer with a fifty cubic foot demand may utilize his demand four times as long as does a customer with a one hundred cubic foot demand, and, therefore, may in a day or a year use twice the amount of gas.

It is clear that neither the customer expense nor the demand expense, forced on the company for service to a particular customer bears any relation whatever to the total amount of gas which that customer may use in a month or a year.

Under the Consumption Charge there are billed to each customer those expenses which vary directly with the amount of gas which the company must supply and these charges are billed to each customer directly in proportion to the amount of gas he consumes. As was pointed out in the paragraph on the Demand Charge, the customer with a fifty cubic foot demand may use twice as much gas in a given month or a year as the customer with a one hundred cubic foot an hour demand.

The total cost to the company for gas alone would be identical whether they supply one customer using ten million cubic feet, ten customers each using one million cubic feet, or one thousand customers each using ten thousand cubic feet.

We have three distinct classes of cost, each of which varies with a factor that does not influence either of the other two classes. Under the Three-Part Rate each customer is billed with each class of expense in proportion as he makes that cost necessary.

CONSERVATION

The conservation of gas that follows the installation of the Three-Part Rate is divided into two general divisions:

First. Since the largest saving to be effected is in the homes of the customers, the gas companies have been pointing out to the public the necessity for the conservation of gas. Various branches of the Federal and state governments have been printing booklets and utilizing the press to reach the public *without any appreciable effect*.

It is my conviction that until such time as the customer appreciates he is directly interested in gas conservation *no progress will be made*. In the installation of the Three-Part Rate this direct financial interest of the customer is brought to his attention at once when he realizes that he must pay a monthly premium unless he uses the gas in efficient appliances, properly adjusted.

There is available to him under the Three-Part Rate any sized demand which he may care to take and his demand charge is proportionate to any maximum demand he chooses. Exhibits of appliances and their varying demands indicate to him the amount of the premium he must pay for the continued use of an inefficient appliance and he at once will have his appliances adjusted if that will lower his demand charge, or he will supplant the inefficient with efficient appliances if that be necessary.

In our various surveys we find cooking ranges burning as high as 106 cubic feet per hour while we have found it practicable to cook meals for twenty people with a demand of 30 cubic feet per hour on identical appliances *properly adjusted*.

Under the Three-Part Rate, as installed at Ottawa, Kansas, the difference in the annual demand charge between those two cooking ranges, one properly and one improperly adjusted, would be \$24.32.

The customer also learns the saving which he would make in the consumption charge under the change in efficiency.

We have not through publicity in the past received the co-operation of the public, but there can be no question that when a customer is told he has to pay \$24.00 per year for the privilege of using an improperly adjusted range, he will at once have that range adjusted.

The effect of this can best be appreciated when you consider that the average demand per customer of 1962 customers in Ottawa, prior to the time their appliances were adjusted, was 118 cubic feet per hour; that at the present time with the limiting meters, installed in November, December and January, the total maximum demand that can be placed on the system by these same 1962 customers is 114,502 cubic feet, which gives an average of 58.4 cubic feet per customer.

This does not mean that the customers had the service, which they previously received, reduced. In fact many of these customers are getting more service at the present time than they had prior to the adjustment of their appliances, for the simple reason that under the flat eighty cent rate they could not afford to do any house heating. They now do considerable incidental heating which comes within the capacity of their demand limiting meters, for which their additional cost, over and above the cost of their other service, is only the additional forty cents per thousand cubic feet which they have to pay as a consumption charge.

The effect on the service, from the standpoint of the company, can be realized when a comparison is made of the present maximum demand of 114,502 cubic feet with the maximum demand under the old conditions of 231,516 cubic feet in a given hour. This city at the present time has a gas service superior to anything it has heretofore experienced and at the same time the company is supplying that service with less than half of the maximum demand previously made on its lines.

Housewives find that they can boil water more quickly; that their pots and pans are not blackened as they previously were with the improperly adjusted burners. When the summer comes the difference in the temperature of their kitchens will be appreciable because of the fact that the heat necessary to do

their cooking is applied to the cooking utensils without a great surplus being radiated into the room, as was the case with the closed top ranges and long flames necessary before the burners were changed.

Some of the appliances which we found in use while installing the Three-Part Rate in Ottawa were scarcely to be recognized by any but older gas men. For instance, we found star burners, two in a set, which would be inserted in the fire box of an ordinary coal range and which for cooking purposes would take the place of two burners on a regular gas range. These star burners used 450 cubic feet of gas per hour, and under the Ottawa rate the demand charge alone on such a burner would be \$144.00 per year. Needless to say they are no longer in use. These star burners were cheap from the standpoint of their original cost but the consumer paid for them many times burning gas at an eighty cent rate. Gas companies will find that the source of much of the feeling against them originates in devices like the star burner which increase the consumer's bill disproportionately to the service rendered.

There is a picture in the booth of Henry L. Doherty & Company of another interesting appliance which we found and which has a demand of approximately 250 cubic feet of gas per hour. The appliance has not been named as yet, but consists of a piece of gas pipe, about four and one-half feet in length with holes drilled in it, placed about four inches below a bath tub. The flames from this homemade burner impinged directly on the bottom of the bath-tub.

These two examples are striking it is true but of little importance because of their rarity.

The real conservation that was effected was in the adjustment of otherwise efficient equipment and the resulting reduction in the gas consumption.

Meritorious as the objects back of the propaganda for the conservation of gas may be, it is my firm conviction, as it is the conviction of all of the men who had anything to do with the installation of the Three-Part Rate at Ottawa, that so far propaganda has had no particular effect upon the public mind. I doubt whether continuation of that propaganda, without the

installation of a proper rate, will postpone the death of the natural gas business.

Second. We come now to another item of conservation, which, while not so large as is possible in the homes, is large enough to have a marked effect on the earnings of the distributing company and on the continuation of the natural gas service.

It will be appreciated at once that the pressure in the distribution mains to supply the present Ottawa demand of 114,000 cubic feet per hour is much lower than that needed for the demand of 231,500 cubic feet necessary under the old conditions.

Leakage is the best customer from the standpoint of load factor the gas company has, but unfortunately does not produce any revenue. It is present twenty-four hours a day and varies in relation to the pressure in the mains. A great reduction in this leakage is at once apparent when the conditions under which the customers use gas are so changed as to enable a reduction in the distributing pressure.

We believe that in Ottawa where we have in the past had maximum pressures of from 9 to 12 ounces, it will be possible with the reduced demands to distribute the necessary gas with a maximum pressure of 4 ounces. The saving in leakage by this reduction will be effected without any expenditure in main repairs and without any reduction in the quality of service.

ADVANTAGES OF RATES WHEN SUPPLY DECLINES

Undoubtedly the conservation that can be effected in the homes of the customers and in the mains of the distributing companies by the installation of the Three-Part Rate will greatly lengthen the life of the gas fields. It is nevertheless true that there is an artificial death date to the natural gas business that we are rapidly approaching.

With a continuation of the present straight meter rates, when the time comes that a company is no longer able to supply all of its customers, it will be necessary to pick out certain groups and entirely discontinue service to them, in order to better the service to the remaining customers.

With the Three-Part Rate in effect we would know the maximum demand to which each customer was limited and it would be practicable and easy for the proper regulatory body to decrease the maximum demand of each customer ten per cent., for instance, by having installed limiting meters of smaller capacity. This would seem to be a much fairer method of bringing the demand on the gas company within its supply than would the method of discontinuing the service to some particular group.

Beyond the question of a doubt the remaining customers would decline to pay fixed charges on that portion of the property which had been scrapped and would decline to amortize that portion of the property from which they never had had and never would have any service.

The proportionate reduction of service would, as long as it was practicable, permit the use of gas to more people for those services where coal and other fuels stand the least possibility of competing on an economic basis. If conservation means anything it means the utilization of the least expensive and most efficient fuel for any particular operation.

If discrimination means anything it would, to my mind, be applicable when gas customers on the North side of a particular town were asked to discontinue the use of a 1,000 B. t. u. gas at, we will say, \$1.00 per thousand cubic feet, and begin using a 525 B. t. u. gas at \$1.50 per thousand cubic feet for the purpose of making good service available to the customers on the South side of town.

DISCRIMINATION IN SERVICE UNDER STRAIGHT METER RATE

Under the present straight meter rate, we have conditions whereby a customer is discriminated against because of the location of his house.

The usual natural gas towns are belted with an intermediate pressure main from which the distributing system is fed. In the ordinary town the better residences are built on the outskirts of the town. The better class of residence presupposes on the part of the owners a financial ability to buy any number of appliances they may desire. The smaller homes and flats, which

on the average are occupied by people with lesser incomes, are, therefore, necessarily located farther from the intermediate lines. With the unlimited demands, present wherever straight meter rates are in use, it is impossible for the gas company to supply adequate service on cold mornings because either the gas supply or the carrying capacity of the mains is insufficient.

When the pressure begins to drop on one of these cold mornings the natural inclination is to light more appliances, with the result that the available gas went to those customers with the most appliances because of the fact that their homes naturally were located nearest to the intermediate lines.

During the extremely cold weather we have had days at a time in Wichita, Kansas, when there was no gas in the poorer homes and where some of the better residences were using from 500 to 1,500 cubic feet of gas per hour for house heating with inefficient appliances.

At the same time these larger residences throughout the year do not use a proportionately greater amount of gas. The occupants of these homes go to Florida or California after the Christmas holidays and spend a large portion of the summer in Colorado.

If there had been a real need for the curtailment of service, the curtailment certainly should have been pro-rated. However, there was no need of a curtailment of service; all that was necessary was a rate which would force the installation of efficient appliances. In one of the houses, for instance, we found appliances which, in the condition we found them, necessitated a maximum demand of 2,500 cubic feet per hour. During the short time that these appliances were all in use the owner of the home was amply able to pay for whatever gas was used at any reasonable straight meter rate. Under the Three-Part Rate his annual demand charge alone would have been \$800.00 per year, and being perfectly able to buy efficient appliances the changes which we suggested could have been effected at once and all of the service which he had previously received could have been supplied with a demand of 250 cubic feet. This would have made 2,250 cubic feet per hour available to smaller consumers on those

cold mornings and would have been sufficient to have operated 75 properly adjusted kitchen ranges.

This consumer, without doubt, believes in conservation as a theory, but until its practical application was forced to his attention no progress had been made, and *the authority which permits a straight meter rate to continue is discriminating against the very class they call the small consumer and whom they have every desire to protect.*

I have cited one particularly bad case. I could, if space permitted, list hundreds.

ADVANCE INFORMATION OF MAXIMUM DEMANDS

Most natural gas companies have been most bitterly denounced by their customers for their lack of service on cold winter days. The customer does not know, and never will understand, why it is on the cold days especially that the service is inadequate.

Our service contracts under the Three-Part Rate run for one year, as is usual with most utilities, and at any time we can tell the maximum amount of gas we can possibly be asked to supply in a given hour *within the year to come*. We can decline to sign up contracts for additional supplies when we have reached the limit of our capacity. We can apply to the commission for a pro-rata curtailment of the present contracts whenever the necessity for that move becomes apparent.

We, therefore, can keep the demands on us within our capacity and can guarantee that these demands for which we have contracts will be supplied with gas not only on the 4th of July but on the 1st of January.

I need not before the members of the Natural Gas Association dwell on the benefits of such a situation.

EFFECT ON APPLIANCES

In the preceding paragraph, I have made reference to two particular appliances, the star burner and a bath-tub heater, the continued manufacture of which ought not to be encouraged.

We found in the installation of the Three-Part Rate that we had to educate the owners of hardware stores, plumbing establishments and department stores on the subject of gas conservation. We found many of these people thoroughly imbued with the idea that it was unhealthy and impracticable to use ranges with spider tops and short flames. Appliance salesmen selling the other type of appliances had created this atmosphere and it had to be overcome before we could get the co-operation of these people.

It is obvious that many types of appliances that inefficiently use gas can be manufactured at a lower price than can a more carefully designed and built appliance which gives a greater efficiency. The first interest of the customer is in the original price of his appliance and the conservation propaganda starts out with this very decided handicap.

Under the Three-Part Rate, however, the additional cost of an inefficient appliance is brought home to the consumer at once, and in the town of Ottawa, where this rate is in effect, it would be hard for the most plausible salesman at the present time to sell them an appliance that was not efficient. This rate practically prohibits the sales of inefficient appliances and certainly puts a premium on the manufacture of others even more efficient than those we now have at our command. Any widespread adoption of this rate will have a tremendous effect on the engineering or research departments of every organization manufacturing appliances, and that recommendation alone ought to take the rate a long way toward adoption.

WHO IS THE SMALL CONSUMER?

Great opposition has been encountered in the past when endeavors have been made to install a rate which contains either a customer charge or a demand charge on the basis that these rates unduly penalize the small consumer. This opposition on the part of City Councils, Public Utility Commissions and other regulatory bodies has been based on the mistaken idea that the small consumer is the man in poor circumstances. A slight consideration would convince most anyone that this theory is absolutely fallacious.

In which home do you suppose there would naturally be used the most gas in a year? Take first an apartment renting for \$100.00 to \$125.00 a month. Most apartments prohibit children, so we can exclude children from this family unless the poodle dog is counted. The size of the rent paid indicates that the man must have a fairly lucrative position and pre-supposes that he does not carry his lunch but eats at a restaurant or club down town. It is likely the man of the house belongs to the golf club and it is fair to assume that he has a vacation every year. It is perfectly safe to assume that the wife does not do her own washing or ironing; that the heat is supplied by the owner of the apartment, and that, therefore, the only uses for gas are for a light breakfast, an occasional dinner at home and no luncheon, because a family of two doing little manual labor will probably have light meals.

In a case before the Kansas Commission, this particular type of customer was most aptly classified under the heading of "toast eaters."

As the other example, we have the man doing manual labor, living in a house or flat, usually with a good sized family, all of whom have good appetites. It is safe to assume that if he is paying a rent not to exceed \$50.00 a month, he has to furnish his own heat and that his wife does her own laundry work; that he does carry his lunch, and that, therefore, there must be prepared the equivalent of three square meals a day, together with the heating of a considerable quantity of water. In all reasonableness which do you assume would be the larger gas consumer of these two homes.

You need not depend on theory because for the year ending June 1st, 1916, there was a survey made of hundreds of customers in Kansas City, Missouri, with the idea of determining what monthly rent these customers paid and what their average annual gas bills might be.

It was found that in 444 homes, principally flats and two apartment buildings, which had an average monthly rental of \$24.77, the average annual gas bill was \$25.74. For these people who had to furnish their own heat and without doubt did their

own laundry work, their average annual gas bill was approximately equal to one month's rent.

An analysis was then made of 1123 apartments which rent on an average for \$39.72 per month, and it was found that the average annual gas bill was \$14.08. Included in this latter group there were 275 apartments that had an average monthly rental of \$56.26 and for this group the average annual gas bill was only \$12.72. In the two latter classes undoubtedly the laundry work was done outside of the home, and in the majority of cases hot water was furnished by the apartment owners, so that these customers used gas only for cooking purposes.

The gross revenue for the two latter groups could not have exceeded the actual customer's expenses that service to them necessitated on the part of the company, and which under the Three-Part Rate are grouped under the heading of "Customer Charge."

The fixed charges on the investment made necessary by the maximum demands of these customers and the actual gas supplied to them was either a gratuity on the part of the company or on the part of that class of customers, which the regulating bodies have in mind when they say "the working men", or the small consumer.

Because of the straight meter rate under which this service was being rendered these people, who could amply afford to pay the cost of service rendered to them, were nothing more than "charity patients". Under the Three-Part Rate they would of necessity have paid all of the costs which service to them entailed on the part of the company.

THE THREE-PART RATE IN THE ELECTRIC BUSINESS

In consideration of the results that may reasonably be expected from the adoption of the Three-Part method of charging for gas, I believe it would be worth while to consider the comparative condition of the artificial gas plants and the electric plants in this country.

It is a matter of general knowledge that the great majority of artificial gas plants are unprofitable while the great majority

of electric plants are profitable. In analyzing this situation it would be well to see what fundamental difference there is between these two classes of business.

First. They both sell a manufactured product.

Second. They are both regulated monopolies.

Third. In a given town the artificial gas plant will have more customers than will the electric plant, so that from the standpoint of the number of possible customers the gas business is most favorably situated.

Fourth. Without question the great majority of customers in a given town if told they could have only one of the two services, would discontinue the use of electricity and continue the gas service, so that from the standpoint of comparative desirability the artificial gas plant has the preference.

The only fundamental difference between the two businesses that can account in any way for the difference in their financial condition is their method of charging for service.

At the present time at least seventy-five per cent of the electric current generated and sold in the United States is sold under some form of rate which takes into consideration the maximum demand which the customer places on the plant as one of the items on which to base a charge, and his total consumption of electric energy as another item.

Up to date, however, the artificial gas business has continued to maintain the old straight meter rate for charging, in which the total charge rendered to the consumer was based on only one factor of service, that being the total consumption.

In a preceding paragraph I have called attention to the apartments in Kansas City where obviously many customers were getting service at less actual cost of reading the meters, rendering the bills and collecting the accounts. Where only a straight meter rate is in vogue the loss sustained by reason of the service rendered to this class of customers must necessarily be added to the actual cost of serving other customers thus making the good customers pay a premium for their service over and above their fair share of the cost.

The old straight meter charge naturally invites unattractive business and in proportion as it attracts unprofitable business it raises the rate which all must pay and discourages business from which a profit could be made. No industry can expect to succeed with such a program.

The Three-Part Rate, however, in that it charges to each customer exactly the cost which service to that customer entails on the part of the company, naturally attracts more and more business from those customers to whom service can profitably be rendered at a low price per unit. Providing the unprofitable customers continue to use service subsequent to the installation of the Three-Part Rate, they have at least to pay the cost of rendering that service, and are, therefore, not a detriment to the company. Inasmuch as the psychological effect of a fixed charge which the customers must pay any way inclines them to use additional gas after having paid the fixed charges for their class of service, it tends to make good customers out of those who have heretofore been unprofitable.

There is no reason which I can see that would not make the gas business even more profitable than the electric business, providing they adopt the same form of rate schedule which the electric business has had in force for many years. The additional business that has been attracted to the electric companies, the rapid growth of those companies and the introduction of electricity in place of other power has been induced by the form of rate which has been in vogue. The progress that can be made by the gas companies will parallel that made by the electric plants in the last fifteen years.

FINANCIAL CONSIDERATIONS

The crying need of public utilities at the present time is sufficient credit to enable them to obtain money necessary for improvements and extensions. A company operating under the Three-Part Rate will, in my opinion, be a better credit risk for the following reasons:—

First. No organization can afford to carry a sufficient number of high class men to make a careful analysis of the con-

ditions under which service will be used by each individual customer who applies to it for service. Under the straight meter rate such an analysis of each application would be necessary to determine whether or not a new customer's business would or would not prove desirable. Under the Three-Part Rate this analysis is made once for all and investors providing funds for extensions to take care of additional customers, who are to be billed under the Three-Part Rate, have the assurance in advance that the company is taking on business on which they will *not* show a loss.

Second. Nearly all of the fixed charges and a considerable portion of the operating expenses are uniform from month to month. The principal variation in the cost of operation of a natural gas property is the total cost of gas, which runs much higher in winter than summer. Under a straight meter rate the company shows a disproportionate amount of revenue above operating expenses in the winter months and quite often shows a deficit below operating expenses in the summer months. Under the Three-Part Rate the fixed charges being provided for in the revenue secured from the Customer Charge and the Demand Charge, the total revenue follows these expenditures up and down month by month. The Consumption Charge furnishes the revenue to pay for the gas and varies in proportion as the gas purchased by the company must vary.

Third. The conservation of gas which follows the installation of the Three-Part Rate tends to add permanency to any investment in the natural gas business, and, therefore, has a very desirable effect on the credit of the natural gas company operating under that rate.

Fourth. A properly devised Three-Part Rate with a consumption charge based on the B. t. u. delivered rather than on the cubic feet of gas delivered makes it very easy to substitute a mixed or an artificial gas for natural gas as that necessity arises. This substitution can be made without any radical rate revision and with assurance to the investors who must furnish the money for the artificial gas manufacturing plant that the revenue will provide for the fixed charges on the additional investment.

CONCLUSION

The Three-Part Rate by its very nature accomplishes the following:—

First. Guarantees the customer that amount of gas for which he contracts, for every hour in the year, and makes it possible for the company to fulfil that guarantee.

Second. Conserves large amounts of gas by financially interesting each customer in adjusting his appliances to efficiently utilize gas.

Third. Conserves large amounts of gas by reducing the maximum demands of the customers so as to permit the company to supply these demands with much lower pressures in the distribution mains, thereby reducing the present leakage.

Fourth. It not only distributes the total cost of gas service to the customers as a group, but makes an equitable distribution of this cost as between individual customers.

Fifth. By conserving the *present supply*, and by making the same service possible with a smaller supply of gas, postpones the date when service must be curtailed due to the decline in the fields.

Sixth. Makes possible a pro-rata curtailment of service to all of the present customers instead of making it necessary to entirely discontinue the service to some customers when curtailment becomes necessary.

Seventh. Does away with the present discrimination on cold mornings whereby those customers nearest the supply lines use wasteful amounts while other customers do without any gas.

Eighth. Permits the company to know for months in advance the maximum amount of gas it can be called upon to supply in any peak hour.

Ninth. Puts a premium on the manufacture and use of efficient devices and holds out a prize for the invention of devices using smaller maximum demands.

Tenth. Makes a better credit risk of any company which adopts it in place of a straight meter rate.

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**END OF
TITLE**